

CLAIMS

1. A method for preparing an oxygen radical-containing calcium aluminate film, characterized in that it comprises subjecting a powder of oxygen radical-containing calcium aluminate to thermal spraying.
2. The method according to Claim 1, wherein the oxygen radical content in the oxygen radical-containing calcium aluminate is at least 10^{20} cm⁻³.
3. The method according to Claim 1 or 2, wherein the main mineral phase in the powder of oxygen radical-containing calcium aluminate is crystalline $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$ (C_{12}A_7) .
4. The method according to Claim 3, wherein the $12\text{CaO}\cdot7\text{Al}_2\text{O}_3$ (C_{12}A_7) is obtained by a solid phase reaction of a Ca source and an Al source in a mol ratio of Ca:Al being from 0.77:1 to 0.96:1.
5. The method according to Claim 4, wherein the solid phase reaction is carried out in a dry oxidizing atmosphere having an oxygen partial pressure of at least 10^4 Pa, a steam partial pressure of at most 10^2 Pa and a temperature of from 1,200 to 1,415°C, or after the solid phase reaction, the system is maintained in such a dry oxidizing atmosphere.
6. The method according to any one of Claims 1 to 5, wherein the thermal spraying is carried out by plasma spraying.
7. A laminate having an oxygen radical-containing

calcium aluminate film formed on a substrate,
characterized in that the oxygen radical-containing
calcium aluminate film is formed by subjecting a powder
of oxygen radical-containing calcium aluminate to thermal
spraying.

8. The laminate according to Claim 7, wherein the oxygen radical-containing calcium aluminate film has a thickness of from 5 to 200 μm .

9. The laminate according to Claim 7 or 8, wherein the oxygen radical content in the oxygen radical-containing calcium aluminate is at least 10^{20} cm^{-3} .

10. The laminate according to any one of Claims 7 to 9, wherein the substrate is a sintered body of zirconium oxide.